

SEQUENCE LISTING

<110> Franco, Christopher Milton Mathew
Coombs, Justin Taylor

<120> A method and agents for improving plant productivity involving
endophytic actinomycetes and metabolites thereof

<130> 19460

<140> 10/563,637

<141> 2006-01-06

<160> 33

<170> PatentIn version 3.1

<210> 1

<211> 1158

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1155)

<223> "n" is unknown nucleotide

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cggccttngg gttgtaaacc tntttcagca gggacgaagt tgacgtgtac ctgtagaaga	420
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gcaacgancg caacccttgg ttccatgttg ccagcacncc ctttgnngtg gtggggacnc	1080
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<210> 2

<211> 1437

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1437)

<223> "n" is unknown nucleotide

<400> 2

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ggggtctaata accggataac actnctgctc tcatgggcag gggttaaaag ctccggcggt	180
gaaggatgag cccgcggcct atcagcttgt tggtagagga atggctcacc aaggcgacga	240
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tacgggaggc agcagtgggg aatattgcaa caatgggcga aagcctgatg cagcgacgcc	360
gcgtgagggga tgacggcctt cgggttgtaa acctctttca gcagggaaga agcgaaagtg	420

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tgaatacggt	cccgggcctt	gtacacaccg	cccgtcacgt	cacgaaagtc	ggtaacaccc	1380
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<210> 3

<211> 317

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(311)

<223> "n" is unknown nucleotide

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actcgggggt	aagccccnag	ctttcacatc	cgacgtgaca	agccgcctac	aanctcttta	180
cgcccaataa	ttccgganaa	cgctcgcacc	ctacntntta	ccgcggctgc	tggcncgtnt	240

ttagccggtg cttcttctgc aggtaccgtc actttcgctt cttccctgct naaaaagggt	300
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<210> 4

<211> 1048

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1043)

<223> "n" is unknown nucleotide

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gcaatcgttg tccggaatta ntgggcgtaa agagntcgta ggcggcttat cacgtcgggt	180
gtgaaagccc ggggcttaag ccccggtct gcattcgata cgggctagct agantntgnt	240
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tggcgaaggc ggatctctgg gccattactg acgctgagga gcgaaagcgt ggggagcgaa	360
caggattaga taccctggta gtccacgccg taaacgggtg gaactaggtg ttggcgacat	420
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aggctaaaac tcaaaggaat tgacgggggc cgcacaagc agcggagcat gtggcttaat	540
tcgacgcaac gcgaagaacc ttaccaaggc ttgacataca ccggaagca tcagagatgg	600
tgccccctt gtggtcgggtg tacaggtggt gcatggctgt cgtcagctcg tgtcgtgaga	660
tgttgggtta agtcccgcaa cgagcgcaac ccttggttct gtgttgccag catgcccttc	720
ggggtgatgg ggactcacag gagaacgccg ggggtcaactc ggaggaagggt ggggacgacg	780
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gctgcgatac cgtgaggtgg agcgaatctc aaaaaagcct gtctcanttc ggattgggggt	900
ctgnaantcg accccatgaa agtcggagtt gctaattatc ccagatcaac attgctggcg	960
gtgaatacgt tcccggggcc ttggtaaaca ccgcccgtca angtnaagaa agtcgggtaa	1020
cacccgaaan ccggtgggcc aancctct	1048

<210> 5
 <211> 508
 <212> DNA
 <213> actinomycete

<220>
 <221> misc_feature
 <222> (1)..(472)
 <223> "n" is unknown nucleotide

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 cccgggcttt cacacccgac ntgacaagcc gcctacaaac tctttacgcc caataattcc 180
 ggacaacgct tgcgccctac ntattaccgc ggctgctggc acntatttag ccggcgcttc 240
 ttctgcaggt accgtcactt tcgcttcttc cctgctgaaa aagggtttaca acccgaaggc 300
 cgctcatccct cacgcggcgt cgctgcatca ggctttcgcc cattgtgcaa tattccccac 360
 tgctgcctcc cntaggaatc tgggccgtgt ctcaatccag tgtggccggt cccctctcng 420
 gccggctacc gtcttccctt ggtnaccatt anctcaccaa caactgatag gncgcgggct 480
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<210> 6
 <211> 1420
 <212> DNA
 <213> actinomycete

<400> 6
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 gtctaatacc ggatacgatt cgggagggcat ctcttggtac tggaaagctc cggcggtgaa 180
 ggatgagccc gcggcctatc agcttggtgt gggtaatggc ctaccaaggc gacgacgggt 240
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tcgaccccat gaagtcggag ttgctagtaa tcgcagatca gcattgctgc ggtgaatacg	1320
ttcccgggcc ttgtacacac cgcccgtcac gtcacgaaag tcggtaacac ccgaagccgg	1380
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<210> 7

<211> 1239

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1217)

<223> "n" is unknown nucleotide

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ttgcacaang ggcgaaagcc tgatgcagng angccgcgtg agggaagacg gcctttgggt	180
tgtaaacctn tttnagcagg gaagaagcga aagtgcgggt acctgcagaa gaagcgccgg	240

ctaantangt gccagcagcc gcggttaatan gtagggcgca agcgttgtcc ggaattattg	300
ggcgtaaaga gcttgttaggc ggcttgtcan gtnggatgtg aaagcccggg gcttaacccc	360
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tggggctgca cacgtgctac aatggccggt acaatgagct gcgatgccgc gaggcggagc	1020
gaatctcaaa aagccggtct cagttcggat tgggggtctg naactcgacc ccatgaantc	1080
ggagttgcta ataatcccaa attcancatt ggtgcggtga atacttcccg ggcttggtac	1140
acnaccgccc gtcaactcac gaaagtcggt naaacccgaa accggtgggc caacccttg	1200
tgggaaggaa ctggccnaag tgggactggc gattgggac	1239

<210> 8

<211> 431

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(424)

<223> "n" is unknown nucleotide

<400> 8

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cgggctttca catccnacgt gacaagccgc ctacaanctc tttagcggca ataattccgg	180
acaacgcttg cgccctacnt attaccgagg ctgctggcac ntatttagcc ggcgcttctt	240

ctgcaggtac cgtcactttc gctncttccc tgctgaaana ggttttacaac ccaaaggccn	300
tcatccctcn ccggcntcnt tgcntcnggc ttncncccat tgttcaannt tccccactgc	360
tnctccctc cggaatctgg gccgntgtct cattcccntt ntggccggtc cccctcncag	420
gccngctacc c	431

<210> 9

<211> 653

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(640)

<223> "n" is unknown nucleotide

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<210> 10

<211> 1444

<212> DNA

<213> actinomycete

<400> 10
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 gctgcggtga atacgttccc gggccttgta cacaccgccc gtcacgtcac gaaagtcggt 1380
 aacaccgaa gccgggtggc caacccttgt gggagggagc tgtcgaagggt gggactggcg 1440
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<210> 11

<211> 503

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(499)

<223> "n" is unknown nucleotide

<400> 11

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cggtctttca caaccgacnt gacaagccgc ctacaanctc ttacnccca ataattccgg	180
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<210> 12

<211> 1173

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1144)

<223> "n" is unknown nucleotide

<400> 12

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ggataacatt ttntcccgca tgggagggg ttgaaagntc cggcggtgaa ggatgagccc	180
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gtggggaata ttgcacaatg ggcgaaagcc tgatgcagcg angccgctg agggatgacg	360
gccttngggt tgtaaaccct ttnagcagg gaagaagcga aagtgcagg acctgcagaa	420
gaagcgccgg ctaaataagt gccagcagcc gcggtaataa gtagggcgca agcgttgtcc	480

ggaattattg ggcgtaaaga gcttgtaggc ggcttgtcan gtnggatgtg aaagcccggg	540
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<210> 13

<211> 1404

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(493)

<223> "n" is unknown nucleotide

<400> 13

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ggttgaaagc tccggcggtg aaggatgagc ccgcggccta tcagcttggt ggtggggtaa	180
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gcctgatgca gcgacgccgc gtgagggatg acggccttcg ggttgtaaac ctttttcagc	360
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gccgcggtaa tangtagggc gcaagcgttg tccggaatta ttgggcgtaa agagnttgta	480
ggcggcttgt cangtcggat gtgaaagccc ggggcttaac cccgggtttg cattcgatac	540

gggctagcta	gagtgtggta	ggggagatcg	gaattcctgg	tgtagcggtg	aaatgcgcag	600
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aagccggtct	cagttcggat	tggggtctgc	aactcgaccc	catgaagtcg	gagttgctag	1260
taatcgcaga	tcagattg	tgcggtgaat	acgttcccgg	gccttgtaga	caccgcccgt	1320
cacgtcacga	aagtcggtaa	caccgaagc	cggtggtcca	accccttggtg	ggagggagct	1380
gtcgaagggtg	ggactggcga	ttgg				1404

<210> 14

<211> 1411

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1411)

<223> "n" is unknown nucleotide

<400> 14

aacacatgca	agtcgaacga	tgaagccgct	tcggtggtgg	attagtggcg	aacgggtgag	60
taacacgtgg	ccaantgtgn	ccgtcactat	gggacgaaga	ccttggaac	ggggctaat	120
accggataac	actctgtccc	gcatgggacg	gggttgaaag	ctccggcggg	gaaggatgag	180
cccgcggcct	atcagcttgt	tgggtgggta	atggcctacc	aaggcgacga	cgggtagccg	240
gcctgagagg	gcgaccggcc	acactgggac	tgagacacgg	cccagactcc	tacgggaggc	300
agcagtgggg	aatattgcac	aatgggcgaa	agcctgatgc	agcgacgccg	cgtgagggat	360

gacggccttc	gggttgtaaa	cctctttcag	caggggaagaa	gcgaaagtga	cggtacctgc	420
agaagaagcg	ccggctaact	acgtgccagc	agccgcggta	atacgtaggg	cgcaagcgtt	480
gtccggaatt	attgggcgta	aagagctcgt	aggcggcttg	tcacgtcgga	tgtgaaagcc	540
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tcggtgccgc	agctaacgca	ttaagttccc	cgcctgggga	gtacggccgc	aaggctaaaa	840
ctcaaaggaa	ttgacggggg	ccgcacaaag	cagcggagca	tgtggcttaa	ttcgacgcaa	900
cgcaagaac	cttaccaagg	cttgacatat	accggaaagc	atcagagatg	gtgccccctt	960
tgtggtcggg	atacaggtgg	tgcattggctg	tcgtcanctc	gtgtcgtgag	atgttggggt	1020
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gaccccatga	agtcgacttt	gctagtactc	gcacgtcaac	attgctgcgc	tgaatacgtc	1320
cccgggcctt	gtacacaccg	cccgtcacgt	cacgaaagtc	ggtaacaccc	gaagccgggtg	1380
gnccaacccc	ttgtgggagg	gagctgtcga	a			1411

<210> 15

<211> 562

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(547)

<223> "n" is unknown nucleotide

<400> 15

ccgccttcgc	caccggtggt	cctcctgata	tctgcgcatt	tcaccgctac	accaggaatt	60
ccnatctccc	ctaccacact	ctagctancc	cgtatcnaat	gcaaaccg	ggttaacccc	120
cgggctttca	cacccnacnt	nacaanccgc	ctacaaactc	tttacgccca	ataattccgg	180

acaacgcttg	cgccctactt	attaccgcgg	ctgctggcac	ttatttagcc	ggcgcttctt	240
ctgcaggtac	cgtcactttc	gcttcttccc	tgctgaaaaa	ggtttacaac	ccgaaggcng	300
tcatccctca	cgcgcntcg	ctgcatcagg	ctttcgccca	ttgtgcaata	ttccccactg	360
ctgcctcccg	tagnantctg	ggccgtntct	cantcccagt	gtggnccggtc	gccctctcag	420
gccggctacc	cgtcgtcncc	tnggtnaacc	attanntcac	caacaagctg	ataggccgcg	480
ggctcatcct	tcaccgccgg	agcttttaac	ccctgcccac	gaaaacagan	gtnttatccg	540
gtattanaac	ccgtttccag	gg				562

<210> 16

<211> 1390

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1362)

<223> "n" is unknown nucleotide

<400> 16

atgcaagtcg	agcggaaagg	cccttcgggg	tactcgagcg	gcgaacgggt	gagtaacacg	60
tgagttaatc	tgccccaggc	tctggatacc	caccggaaaa	cggtgattaa	taccgaatac	120
gacaaccgat	ttgcatgac	tggtggtgna	aagtttttcg	gcctgggatg	tgcttcgcgg	180
cctatcagct	tgttggtgag	gtaatggctc	acccaaggct	tcgacggtag	ccggcctgag	240
agggtgaccg	nccacactgg	gactgagaca	cggcccagac	tcctacggga	ggcagcagtg	300
gggaatattg	gacaatgggc	ggaagcctga	tccagcaacg	ccgcgtgagg	gatgacggcc	360
ttcgggttgt	aaacctcttt	cagcacagac	gaagcgcaag	tgacggtatg	tgcagaagaa	420
ggaccggcca	actacgtgcc	agcagccgcg	gtaatacgta	gggtccgagc	gttgtccgga	480
attattgggc	gtaaagggct	cgtaggcggt	ctgtcgcgtc	gggagtgaaa	accaggtgct	540
taacacctgg	cctgcttttcg	atacgggcag	nctagaggta	cncaggggag	aatggaattc	600
ctggtgtagc	ggtgaaatgc	gcagatatca	ggaggaaaca	ccggtggcga	agnccggttct	660
ctgggagtat	cctgacgctg	aggagcgaaa	gtgtggggag	cgaacaggat	tagataccct	720
ggtagtccac	accgtaaacg	ttgggcgcta	ggtgtgggac	acattccacg	tgttccgtgc	780
cgcagctaac	gcattaancg	ccccgcctgg	ggagtacggc	cgcaangcta	aaactcanag	840

gaattgacgg	gggcccgcac	aagcggcgga	gcatgcggat	taattcgatg	caacgcgaag	900
aaccttacct	gggtttgaca	tacaccggaa	agccgtacag	atacggcccc	ttttagtcgg	960
tgtacaggtg	gtgcatggct	gtcgtcagct	cgctgtcgtg	agatgttcgg	gttaagtccc	1020
gcaacgagcg	caaccctcgt	cctatgttgc	cagcaattcg	gttggggact	cataggagac	1080
tgccggggtc	aactcggagg	aaggtgggga	tgacgtcaag	tcatcatgcc	ccttatgtcc	1140
agggcttcac	gcatgctaca	atggccggta	caaagggtcg	cgatcccgtg	aggggtgagcg	1200
aatcccaaaa	agccggtctc	agttcggatt	gggggtctgca	actcgacccc	atgaagtcgg	1260
agtcgctagt	aatcgcagat	cagcaacgct	gcggtgaata	cgttcccggg	ccttgtacac	1320
accgcccgtc	acgtcacgaa	agtcggcaac	acccgaagcc	antggcccaa	ctcgtaagag	1380
agggagctgt						1390

<210> 17

<211> 1411

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(638)

<223> "n" is unknown nucleotide

<400> 17

gtgcttaaca	catgcaagtc	gaacgatgaa	gccgcttcgg	tggtggatta	gtggcgaacg	60
ggtgagtaac	acgtgggcaa	tctgcccttc	actctgggac	aagccctgga	aacgggggtct	120
aataccggat	aacactctgt	cccgcattgg	acgggggttg	aagctccggc	ggtgaaggat	180
gagcccgcgg	cctatcagct	tggtgggtgg	taatggccta	ccaaggcgac	gacgggtagc	240
cggcctgaga	gggcgaccgg	ccacactggg	actgagacac	ggcccagact	cctacgggag	300
gcagcagtgg	ggaatattgc	acaatgggcg	aaagcctgat	gcagcgacgc	cgctgagggg	360
atgacggcct	tcgggttgta	aacctctttc	agcaggggaag	aagcgaaagt	gacgggtacct	420
gcagaagaag	cgccggctaa	ctacgtgcca	gcagccgcgg	taatacgtag	ggcgcaagcg	480
ttgtccggaa	ttattgggcg	taaagagctc	gtaggcggct	tgtcacgtcg	gatgtgaaag	540
cccggggctt	aaccccgggg	ctgcattcga	tacgggctag	ctagagtgtg	gtaggggaga	600
tcggaattcc	tggtgtagcg	gtgaaatgcg	cagatatnca	ggaggaacac	cggtggcgaa	660

ggcggatctc tggccattac tgacgctgag gagcgaaagc gtggggagcg aacaggatta	720
gataccctgg tagtccacgc cgtaaactgtt ggggaactagg tgttggcgac attccacgtc	780
gtcggtgccg cagctgaacg cattaagtcc cccgcctggg gagtacggcc gcaaggctaa	840
aactcaaagg aattgacggg ggcccgcaca agcagcggag catgtggctt aattcgacgc	900
aacgcgaaga accttaccaa ggcttgacat ataccgaaa gcatcagaga tgggtgcccc	960
cttgtggtcg gtatacaggt ggtgcatggc tgtcgtcagc tcgtgtcgtg agatgttggg	1020
ttaagtcccc caacgagcgc aacccttggt ctgtgttgcc agcatgccct tcggggtgat	1080
ggggactcac aggagactgc cggggtcaac tcggaggaag gtggggacga cgtcaagtca	1140
tcatgccccct tatgtcttgg gctgcacacg tgctacaatg gccggtacaa tgagctgcga	1200
tgccgcgagg cggagcgaat ctcaaaaagc cgggtctcagt tcggattggg gtctgcaact	1260
cgaccccatg aagtcggagt tgctagtaat cgcagatcag cattgctgcg gtgaatacgt	1320
tcccgggcct tgtacacacc gccgtcacgt cacgaaagtc ggtaacaccc gaagccggtg	1380
gccaaccgc cttgtgggag ggaactttcc a	1411

<210> 18

<211> 1370

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1367)

<223> "n" is unknown nucleotide

<400> 18	
atgcaagtng aacgatgaan ccntttgggg tggattagtg gcgaacgggt gagtaanang	60
tgggcaattt gcccttcaat ttgggacaag ccctggaaac ggggtntaat accggataac	120
antntgtccc gcatgggacg gggttaaaag ctccggcggt gaaggatgag cccgcggcct	180
atnagcttgt tgggtggggtg atggcctacc aaggcgacga cgggtagccg gcctgagagg	240
gcgaccggcc aactgggac tgagacacgg ccagactcc tacgggaggc agcagtgggg	300
aatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagggat gacggccttc	360
gggttgtaaa cttttttcag cagggaaaga gcgaaagtga cggtagctgc agaagaagcg	420
ccggctaaat angtgccagc agccgcggta atangtaggg cgcaagcggt gtccggaatt	480

attgggcgta aagagtttgt aggcggcttg tcacgtngga tgtgaaagcc cggggcttaa	540
ccccgggttt gcattcgata cgggctagct agagtgtggt aggggagatc ggaattcctg	600
gtgtagcggg gaaatgcgca gatatcagga ggaacaccgg tggcgaaggc ggatctcttg	660
gccattactg acgntgagga gcgaaagcgt ggggagcnaa cagnattaga taccctggta	720
gtccaagccg taaacgttgg gaactangtg ttggcgacat tccacgtcgt cnntgccgca	780
nctaacgcat taagttcccc gcctggggag tacggccgca aggctaanac tcaaaggaat	840
tgangnnggc ccgcacaagc agcggagcat gtggcttant tcnacgcanc gcgaagaacc	900
ttaccaaggt ttgcatata ccggaaagca tcagagatgg tgccccctt gtggtcggta	960
tacaggtggt gcntggctgt cgtcagctcg tgtcgtgaca tgttggttaa gtcccgtcaa	1020
cgaggcgcaa cccttgttnt gtgtngccag catgcccttc ggggtgatgg ggactcacag	1080
gagactgccg ggggtcaactc ggaggaaggt ggggacgacg tcaagtcac atgcccccta	1140
tgtcttgggc tgcacacgtg ctacaatggc cgggtacaatg agctgcgatg ccgcgaggcg	1200
gagcgaatct caaaaagccg gtntcagttc ggattggggg ctgcaactcg accccatgaa	1260
gtcggagttg ctagtaatcg cagatcagca ttgctgcggt gaatacgttc ccgggccttg	1320
tacacaccgc ccgtcacgtc acgaaagtcg gtaacacccg aagccgntgg	1370

<210> 19

<211> 1162

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1156)

<223> "n" is unknown nucleotide

<400> 19

gaacgatgaa gccgtttcgg tgggtggatta gtggcgaacg gtgagtaaaa gtggcaattt	60
ncccttcatt ttggacaagc cctggaaacg ggtttaanac cggataacat tntgtcccg	120
atgggacggg gttgaaagnt cccggcgggtg aaggatgagc ccgcggcnta tcagcttggt	180
gggtggggtaa tggcctacca aggcgacgac gggtagccgg cctgagaggg cgaccggcca	240
cactgggant gagacacggc ccagactcct acgggaggca gcagtgggga atattgcaca	300
atgggcgaaa gcctgatgca gcgacgccgc gtgagggatg acggccttcg gggtgtaaac	360

ctntttcagc agggaagaag cgaaagtgc ggtacctgca gaagaagcgc cggctaaata	420
ngtgccagca gccgcggtaa tangtagggc gcaagcggtg tccggaatta ttgggcgtaa	480
agagcttgta ggcggcttgt cangtcggat gtgaaagccc ggggcttaac cccgggtttg	540
cattcgatac gggctagtta gagtgtggta ggggagatng gaattcctgg tgtagcggtg	600
aaatgcgcag atatcaggag gaacaccggt ggcgaaggcg gatctctggg ccattactga	660
cgctgaggag cgaaagcgtg gggagcnaac aggattagat accctggtag tccacgccgt	720
aaacgttggg aactaggtgt tggcgacatt ccacgtcgtc ggtgccgcag ctaacgcatt	780
aagttccccg cctggggagt acggccgcaa ggctaaaact caaaggaatt gacggggggc	840
cgcacaagca gcggagcatg tggcttaatt cgacgcaacg cgaacaacct taccaaggct	900
tgacatatac cggaagcat canagatggt gcccccttg tggtcggtat acangtggtg	960
catggctgtc gtcagctcgt gtcgtgagat gttgggttan gtcccgaac gagcgcnacc	1020
cttgttctgt gtcgncnagc atgcccttcg nggtgatggg gactcacang agactgncgg	1080
ggtccactcg gaggaagggtg gcgacnacgt canntcatca tgccccctta tgtcttggn	1140
ctggccacgt gcnacnatgg cc	1162

<210> 20

<211> 1411

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(1404)

<223> "n" is unknown nucleotide

<400> 20

gctggcggcg tgcttaacac atgcaagtcg aacgatgaag ccgcttcggt ggtggattag	60
tggcgaacgg gtgagtaaca cgtgggcaat ctgcccttca ctctgggaca agccctggaa	120
acgggggtcta ataccggata acactctgtc ccgcatggga cggggttgaa agctccggcg	180
gtgaaggatg agcccgcggc ctatcagctt gttggtgggg taatggccta ccaaggcgac	240
gacgggtagc cggcctgaga gggcgaccgg ccacactggg actgagacac ggcccagact	300
cctacgggag gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc	360
cgcgtgaggg atgacggcct tcgggttgta aacctctttc agcaggaag aagcgaaagt	420

gacggtacct gcagaagaag cgccggctaa ctacgtgcca gcagccgcgg taatacgtag	480
ggcgcaagcg ttgtccggaa ttattgggcg taaagagctc gtaggcggct tgtcacgtcg	540
gatgtgaaag cccggggcctt aaccccggtt ctgcattcga tacgggctag ctagagtgtg	600
gtaggggaga tcggaattcc tgggtgtagcg gtgaaatgcg cagatatcag gaggaacacc	660
ggtggggaag gcggatctct gggccattac tgacgctgag gagcgaaagc gtggggagcg	720
aacaggatta gataccctgg tagtccaagc cgtaaacgtt gggaactang tgttggcgac	780
attccacgtc gtcggtgccg cagctaacgc attaagttcc ccgtcctggg gagtacggcc	840
gcnaggctaa aactcaaagg aattgacggg ggcccgacac agcagcggag catgtggctt	900
anttcgacgc nacgcgaaga accttnccaa ggctgacata taccggaaag catcacagat	960
ggtgcccccc ttgtggtcgg tatacagggg ggtgcatggc tgttcgtcag ctctgtgtcgt	1020
gagatgttgg gttaagtccc gcaaagagcg caaccgtgtt ctgtgttgcc agcatgccct	1080
tcgggggtgat ggggactcac acgagactgt cnggggtcaac tcggaggaag gtggggacga	1140
cgtcaagttc atcatgcccc ttatgtcttg ggctgcacac gngctacaat ggccggtaca	1200
atgagnnggg atgccgcgag gcggagcgaa tctcaaaaag ccggtctcag ttcggattgg	1260
ggtctgcaac tgaccccatg aagtcggagt tgctagtaat cgcagatcag cattgtctgcg	1320
gtgaatacgt ncccgggcct ngtaacacacc acccgctcacg tcacgaaagt cggtaacacc	1380
ctaagccggt gncccaaccc cttntgggag g	1411

<210> 21

<211> 549

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(431)

<223> "n" is unknown nucleotide

<400> 21

ccaganatcc gccttcgcca ccggtgttcc tcctgatatc tgcgcatctc accgctacac	60
caggaattcc gatctcccct accacactct agctagcccc tatcgaatgc agacccgggg	120
ttaagccccg ggctttcaca tccgacgtga caagccgcct acgagctctt tacgccaat	180
aattccggac aacgcttgcg ccctacgtat taccgcggct gctggcacgt agttagccgg	240

cgcttcttct gcaggtaccg tcactttcgc ttcttccctg ctgaaagagg tttacaaccc	300
gaaggncgtc atccctcacg cggcgtcgtc gcatcaggct ttcgcccatt gtgcaatatt	360
ccccactgct gcctcccgta ggagtctggg ncgtgttcaa tnccagtggg,gggccggtcg	420
ccctctcagg nccggtaccg tcgtcgcctt ggtaggcatt accacaacaa gctgataggc	480
gggggtcatc cttcaacgcc ggagcttcaa acccggtccat gcgggacaag tgtatccggt	540
attaaaccc	549

<210> 22

<211> 672

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(643)

<223> "n" is unknown nucleotide

<400> 22	
tcagtnatgg cccagaanga tccgncttcg ccaccggtgt tcctcctgat atctgcgcat	60
ttcaccgcta caccaggaat tccgatctcc cctaccacac tctaactagc ccgtatcgaa	120
tgcagacccg gggttaagcc ccgggctttc acatccgacg tgacaagccg cctacgagct	180
cttnacgccc aataattccg gacaacgctt gcgccttacg tattaccgcg gctgctggca	240
cgtagttagc cggcgtttct tctgcaggta ccgtnacttt cgcttcttcc ctgctgaaag	300
aggtttaciaa cccgaaggcc gtcttccttc acgcggcgtc gctgcatcag gctttcgccc	360
atngtgcant attccccact gntgntctcc gtangagtct gggccgtgtc tcagtcccag	420
tgtggccggt cgnctcttca ggccggctac cgtcgtcgcc ttggtaggnc attaccacc	480
aacaagctga tangtcgnng gctcatcctt caccgncgga gntttaaccc cgtncatgcg	540
ggacagagtg ttatccggtg ttanaccgt atncagggtc tgtcccatag tgaagggnag	600
atngccacgt gttatcaccg ttcgncacta atnatcancg aancggcttc atcgttcgac	660
ttgcatgtgt ta	672

<210> 23

<211> 678

<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(648)
<223> "n" is unknown nucleotide

<400> 23
ctcagcgtca gtcattggcca agagatccgc cttcgccacc ggtgttcctc ctgtatatct 60
gcgcatttca ccgctacacc aggaattccg atctccccta ccacactcta gctagcccgt 120
atcgaatgca gacccggggg taagccccgg gctttcacat ccgacgtgac aagccgccta 180
cgagctcttt acgcccata attccggaca acgcttgccg cctacgtatt accgcggtg 240
ctggcacgta gtttagccggc gcttcttctg caggtaccgt cactttcgct tcttccctgc 300
tgaaagaggt ttacaacccg aaggccgtca tccctcacgc ggcgtcgctg catcaggctt 360
tcgcccattg tgcaatattc cccactgctg cctcccgtag gagtctgggc cgtgtctcag 420
tcccagtgtg gccggtcgcc ctctcaggcc ggctaccgtg cgtcgccctg gtaggccatt 480
acccaccaac aagctgatag gccgcgggct catccttcan cgcgcggagct ttaaccgctc 540
catgctgggac agagtgttat ccggtattaa acccggttca gggcttgtcc canagtgaag 600
ggcagattgc cacgtgttat canccgttcg ncactaatca cancgaancg gggtcatcgt 660
tcgacttgca tgtgttaa 678

<210> 24
<211> 688
<212> DNA
<213> actinomycete

<220>
<221> misc_feature
<222> (1)..(666)
<223> "n" is unknown nucleotide

<400> 24
ggcccagana tccgncttcg ccaccggtgt tcctcctgaa tatctgcgca tttcaccgct 60

acaccaggaa ttccgatctc ccctaccaca ctctaactag cccgtatcga atgcagaccc	120
ggggttaagc cccgggcttt cacatccgac gtgacaagcc gcctacgagc tctttacgcc	180
caataattcc ggacaacgct tgcgccctac gtattaccgc ggctgctggc acgtaattag	240
ccggcgcttc ttctgcaggt accgtcactt tcgcttcttc cctgctgaaa gaggtttaca	300
acccgaaggc cgtcatccct cacgcggcgt cgctgcatca ggctttcgcc cattgtgcaa	360
tattccccac tgctgnctcc cgtangagtc tgggccgtgt ctcagtccca gtgtggccgg	420
tcgncctctc aggccggcta ccgtcgtcgc cttggtaggc cattacccca ccaacaagct	480
gatangccgn gggctcatcc ttcancgtcg gagctttcaa ncccgtccat gcgggacaga	540
gtgttatccg gtattanacc ccgtntcagg gcttgtccan agtgaagggc agatngccac	600
gtgttatcac cgttcgccac taatnacanc gaaacggctt atcgtncgac tgcattgtgtt	660
aacacncgca gcgttcgtcc tgagccag	688

<210> 25

<211> 702

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(658)

<223> "n" is unknown nucleotide

<400> 25

ccctcagggc cagtaatggg cccagagatc cgccttcgcc accggtgttc ctcctgaata	60
tctgcgcatt tcaccgctac accaggaatt ccgatctccc ctaccacact ctagctagcc	120
cgtatcgaat gcagacccgg ggttaagccc cgggctttca catccgacgt gacaagccgc	180
ctacgagctc tttacgcca ataattccgg acaacgcttg cgccctacgt attaccgagg	240
ctgctggcac gtagttagcc ggcgttctt ctgcaggtag cgtaactttc gcttcttccc	300
tgctgaaaga ggtttacaac ccgaaggccg tcatccctca cgcggcgtcg ctgcatcagg	360
ctttcgccca ttgtgcaata ttccccactg ctgcctcccg taggagtctg ggccgtgtct	420
cagtcccagt gtggccggtc gccctctcag gccggctanc cgtcgtcgcc ttgggtaggc	480
attanccan caacaagctg ataggncgag ggctcatnct tcaacgccgg agctttcaan	540
cccgtccatg cgggacagag tgttatncgg tattaaaccc gtttcagggc ttgttccaga	600

gtgaagggca gattgccacg tgttatcaac cgttcggcac taatcacaac gaagcggntt	660
atcgttcgac ttgcatgtgt taacaagccg ccagcgttcg tc	702

<210> 26

<211> 711

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(687)

<223> "n" is unknown nucleotide

<400> 26		
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gcagacccgg ggttaagccc cgggctttca catccgacgt gacaagccgc ctacgagctc	180	
tttacgcca ataattccgg acaacgcttg cgccctacgt attaccgcgg ctgctggcac	240	
gtagttagcc ggcgcttctt ctgcaggtac cgtcactttc gcttcttccc tgctgaaaga	300	
ggttttacaac ccgaaggccg tcatccctca cgcggcgctg ctgcatcagg ctttcgcca	360	
ttgtgcaata ttccccactg ctgcctcccg taggagtctg ggccgtgtct cagtcccagt	420	
gtggccggtc gccctctcag gccggctacc cgtcgtcgcc ttggtaggcc attacccac	480	
caacaagctg ataggccgcg ggctcatcct tcaccgncgg agctttaacc ccgtcccatg	540	
cgggacagag tgttatccgg tattagaacc cgtttccagg gcttgccca gagtgaagg	600	
cagattgcc cgtgttactc anccgttcgn cactaatcan caacgaagcg gcttcatcgt	660	
tcgacttgca tgtgttaagc acgccgncag cgttcgtcct gagccaggat c	711	

<210> 27

<211> 522

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(465)

<223> "n" is unknown nucleotide

<400> 27

tcagtatcng	cccagagatc	cgccttcgcc	accggtgttt	cctcctgata	tctgcgcatt	60
tcaccgctac	accaggaatt	ccgatctccc	ctaccgaact	ctagcctgcc	cgtatcgact	120
gcagacccgg	ggttaagccc	cgggctttca	caaccgacgt	gacaagccgc	ctacgagctc	180
tttacgccc	ataattccgg	acaacgcttg	cgccttacgt	attaccgcgg	ctgctggcac	240
gtagttagcc	ggcgcttctt	ctgcaggtac	cgtcactttc	gcttcttccc	tgctgaaaga	300
ggtttacaaa	ccgaaggccg	tcatccctca	cgcggcgctc	ctgcatcagg	ctttcgccca	360
ttgtgcaata	ttccccactg	gtgnctcccg	tangagtctg	gggcgtgtct	cantccagtg	420
tgggcggtcg	cctctcaggg	cggctaccgt	cgtcgcttgg	tgagnacta	ctcacaacaa	480
gctgataggc	gcgggctcat	ctggaacggc	ggagctttac	ac		522

<210> 28

<211> 670

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(638)

<223> "n" is unknown nucleotide

<400> 28

tcagtaatgg	cccaganatc	cgncttcgcc	accggtgttc	ctcctgatat	ctgcgcattt	60
caccgctaca	ccaggaattc	cgatctcccc	taccacactc	taactagccc	gtatcgaatg	120
cagacccggg	gttaagcccc	gggctttcac	atccgacgtg	acaagccgcc	tacgagctct	180
ttacgccc	aa taattccgga	caacgcttgc	gccctacgta	ttaccgcggc	tgctggcacg	240
tagttagccg	gcgcttcttc	tgcaggtacc	gtcactttcg	cttcttccct	gctgaaagag	300
gtttacaacc	cgaaggccgt	catccctcac	gcggcgctgc	tgcatcaggc	tttcgccccat	360
tgtgcaatat	tccccactgc	tgctctccgt	angagtctgg	gccgtgtctc	agtcccagtg	420
tggccggtcg	ccctctcagg	ccggctaccg	tcgtcgcctt	ggtaggccat	taccaccaa	480

caagctgata ngncgngggc tcatccttca ccgncggagc tttcaanccc gtcccatgcg	540
ggacagagtg ttatccggtg ttaaaccctg ntccagggtc tgtccatagt gaagggcaga	600
ttgccaaagtg ttatcanccg ttcgncacta atcatcancg aagcggcttc atcgttcgac	660
tgcatgtgtt	670

<210> 29

<211> 676

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(666)

<223> "n" is unknown nucleotide

<400> 29	
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tgcgcatctt accgctacac caggaattcc gatctcccct accacactct anctagcccg	120
tatcgaatgc agacccgggg ttaagccccg ggctttcaca tccgangtga caagccgcct	180
acgagctctt tacgccaat aattccggac aangcttgcg ccctacgtat taccgcggt	240
gctggcacgt agttagccgg cgcttcttct gcagggtaccg tcactttcgc ttcttccctg	300
ctgaaagagg tttaacaacc gaaggccgct atccctcaen cggcgctcgt gcatcaggct	360
ttcgcccatt gtgcaatatt cccactgct gcctcccgtg ggagtctggg ccgtgtctca	420
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ccccaccaac aagctggata ggncgggggc tcattcttca ccgccggaag ctttaanccc	540
gtccatgcgg gananagtgn atcccngtat taaaccnngt ttcagggtt gtccanagt	600
aagggngatt gcccnagtgt ttatcncccg ttcgccanta atcnacaacg aaagcggntt	660
cntcgnttcg acttgc	676

<210> 30

<211> 626

<212> DNA

<213> actinomycete

<220>

<221> misc_feature

<222> (1)..(618)

<223> "n" is unknown nucleotide

<400> 30

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ccgctacacc aggaattccg atctccccta ccacactcta gctagcccgt atcgaatgca	120
gacccgggggt taagccccgg gctttcacat ccgacgtgac aagccgccta cgagctcttt	180
acgccaata attccggaca acgcttgccg cctacgtatt accgcggctg ctggcacgta	240
gttagccggc gcttcttctg caggtaccgt cactttcgct tcttcctgc tgaaagaggt	300
ttacaaccgg aaggccgtca tccctcacgc ggcgtcgtg catcaggctt tcgcccattg	360
tgcaatatcc cccactgctg cctcccgtag gagtctgggc cgtgtctcag tcccagtggtg	420
gcggtcgccc tctcaggccg gntanccgtc gtcgccttgg tangccatta ncccaccaac	480
aagctgatan gccgngggct catccttcan cgccggagct tttaaccccg tcccatgcgg	540
gacagagtgt tatccggtat tagatcccgt ntccagggct tgtncatagt gaagggcana	600
ttgccacgtg ttactcancc gttcgc	626

<210> 31

<211> 20

<212> DNA

<213> primer

<400> 31

agagtttgat cmtggctcag	20
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<210> 32

<211> 21

<212> DNA

<213> primer

<400> 32

ctgtttgctc cccacgcttt c	21
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<210> 33

<211> 22

<212> DNA

<213> primer

<400> 33

tacggytacc ttgttacgac tt

22